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ADDITIONAL NOTES ON GOMPHOGASTER.

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Observations made of this rotifer since the characters of the genus were published establishes the necessity for some slight corrections therein which it is the purpose of this paper to supply. This rotifer was first observed by the writer in the filterings from water of Lake Erie in July, 1882, and the single specimen then seen was figured and briefly described in the proceedings of this Society at the Elmira meeting, 1882, vol. iv, p. 187, pl. iii, fig. 76, etc., but not then named for the reason that I had not had sufficient time to thoroughly search the bibliography of the subject to determine whether the creature was really new. This point having been decided affirmatively before the Pittsburgh meeting, 1887, the new rotifer was there fully described and figured, vol. ix, p. 250, plate, page 253, and given the generic name of the title.

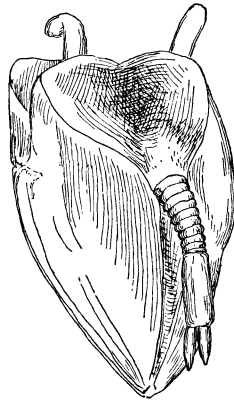
Although occasional examinations were made by me of lake-water filterings, no more specimens of this rotifer were found by me; but in the spring of 1889 a specimen was reported by Mr. Haskins, of Cleveland, and in the fall of 1889 Dr. L. B. Tuckerman, of Cleveland, who was then making continuous and systematic examinations of the lake-water filterings, observed a number of specimens, of which he at once informed me, and furnished me with both living and mounted specimens, from the study of which the following notes, additional to the description before published and in correction thereof, are derived.

This rotifer is figured in the supplement to Hudson & Gosse's Rotifera, pl. xxxiv, fig. 36, etc., and is described, substantially as in vol. ix of Proc., at pp. 57, 58 of the supplement, where it appeared, much to my regret, before I had seen the additional specimens obtained by Dr. Tuckerman, and before I was aware that it had ever been observed elsewhere. After the appearance of the Hudson & Gosse supplement, but before I had seen it, I learned from Professor Kellicott that a rotifer probably identical with Gomphogaster had been observed by Prof. C. L. Herrick at Granville, Ohio, and figured in vol. 1 of the Bulletin of Denison University, published

in December, 1885. Although the figures there given differ in several respects from the specimens later observed by me, it does so no more, probably, than my own figures of the single specimen originally observed, which are now to be corrected; and from the figures and description by Prof. Herrick, taken together, I am satisfied that his specimens are generically the same as that observed by me and those obtained by Dr. Tuckerman, whatever may be the conclusion as to specific identity.

The lorica is not rigidly closed on the ventral apex below (behind) the foot, but the two lateral valves are joined by a flexible, tough skin, and can be closed together at will by the animal until their ventral edges are nearly or quite in contact. The sides are firm, and their ventral edges have a salient angle just opposite the insertion of the foot; hence, when the sides are drawn together, the foot must project in a forward direction, as seen in fig. 3, vol. ix, and fig. 36*c*, pl. xxxiv, Hudson & Gosse; also shown by the photograph, accompanying this paper, from one of the mounted specimens of Dr. Tuckerman. There is a transverse thickening of the skin before and behind the foot, forming a socket, in which the foot is seated. When distended, the lorica forms a shallow furrow along the ventral apex from the foot to the posterior end of the shell, in which furrow the foot generally trails along when the animal is swimming, the toes reaching nearly or quite to the end of the shell.

The accompanying cut is made from a pen drawing from photographs.



The sides of the lorica curve outward gracefully to the upper dorsal corners; below (behind) the angle at the foot the sides sink

in and are somewhat hollowed. On the dorsal surface the lorica has a deep, transverse, chevron-shaped fold, doubly plicate, behind which the back is occupied by a number of longitudinal folds, all converging to the acute posterior apex of the shell; of these folds two on each side of the median line are the deeper and more distinct, throwing the back into distinct ridges between them. Forward of the chevron-shaped dorsal fold the back is flattened, smooth, with two diverging sub-median ridges extending to the frontal margin of the shell, and between these and the lateral margin the dorsal surface is considerably depressed or hollowed. From the ends of the transverse dorsal fold a cleft extends on each side to the dorso-lateral corner of the dorsal plate, which is joined to the sides at this cleft merely by the soft and yielding integument of the body. The frontal edge of the dorsal plate is slightly incurved, making the corners prominent, and extends beyond the sides. As a result of this structure the portion of the dorsal plate forward of the transverse fold is movable hinge-like thereon, and the anterior corners flexible sidewise, so that it may be folded forward and much reduce the exposure of the cephalic extremity of the body, the sides being at the same time drawn in at their anterior extremities, so as to nearly close together the lorica, tortoise-like. All the folds of the lorica are more or less dilatable, but I have never seen any of them completely effaced. The folds on the back and that along the dorso-lateral angle are the most persistent.

In the original type specimen the areolation of the lorica was distinct and marked. In the later specimens this characteristic is quite variable, being strong in some and very faint in others.

The foot is wrinkled for about two-thirds its length from the body; then succeeds a stout, smooth joint, from which proceed two stout toes laterally appressed; so that in life, when viewed from the side, they appear as a single toe. When the lorica is shut up, as it may be expressed, the foot points forward and the toes reach nearly or quite to the anterior extremity of the body, and thus guard the otherwise unprotected cephalic extremity.

The mastax is large, pyriform, transversely barred, with a protruding angle within the cleft and on the ventral side. The mastax is placed high up and the trophi are moderately strong.

The eye is single, dorsally placed, and within the margin of the shell as the animal is normally extended. Whether the body can be so extended as to bring the eye outside the lorica I cannot say from observation, but it is probable that it can.

The two protruding organs (antennæ or tactile processes) are curved, clavate, and slightly bifid at their extremities. Besides being partially retractile they can be curved down and thus apparently shortened.

The trochal disc is still not satisfactorily made out for the reason that it is only fully expanded while the animal is swimming freely, at which time it is impossible to keep the disc in focus of a sufficiently high power long enough to make out the details of structure. At the least indication of confinement, as by getting among conferva or the flocculi of vegetable débris always present in lake filterings, the animal draws in, partially closing together the lorica, and either lies quietly with its retracted cilia lazily working or kicks lustily with its foot, and thus spins itself about without protruding its disc, until, of a sudden, it starts off with a dash, as if touched up with a sharp point, and usually has to be patiently searched for before it is again found.

The generic characters published should, therefore, be modified as follows: Foot wrinkled at base, jointed toward extremity; toes two, large, laterally appressed; eye single, dorsal; mastax pyriform, moderately large.

As to the specific identity of the various specimens thus far observed, it may be asserted confidently that all the specimens observed at Cleveland are of the same species, *G. areolatus*, notwithstanding the variation in the degree of distinctness of the areolar markings. As to the specimens observed by Prof. Herrick, some doubt may be based upon the fact that the anterior margin of the dorsal plate was notched, as stated by him and shown in his figures, while in *areolatus* it is smooth and gracefully curved. In all other respects, including the areolation of the lorica, Prof. Herrick's specimens agree with *areolatus*, and it may be noted that in size his specimens agree exactly with the original type specimen of 1882, while all those later observed at Cleveland were noticeably smaller.